

## ORIGINAL ARTICLE

# Use of information and communication technology among dental students and registrars at the faculty of dental sciences, university of Lagos

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## Abstract

The aim of this study was to investigate the use of information technology amongst dental students, dental nursing students and resident doctors in training at the faculty of dental Surgery University of Lagos. A structured questionnaire was distributed to 58 clinical dental students in 4<sup>th</sup> and 5<sup>th</sup> years of training in the 2010/2011 academic year, 36 dental nursing students and 63 resident doctors undergoing specialist training. All participants have access to the computers, 2.5% within the University and 31% at home and internet cafes and about 50% have the basic skills required. A significant difference was observed between the resident doctors and clinical dental students ( $P = 0.003$ ), between resident doctors and dental nursing students ( $P = 0.0001$ ) when the use of computer for study was compared. Over 95% of participants have access to internet and about 50% of them use the internet for their studies. A significant difference ( $P = 0.005$ ) was observed between clinical dental students and dental nursing students that use the internet and word processing. The resident doctors used the computers for multimedia and MedLine search tools more than clinical dental students ( $P = 0.004$ ) and dental nursing students (0.0006). The findings of the study show that dental students and resident doctors in training have the requisite knowledge to operate the computer for use in their study and personal activities.

**Key words:** Dental students, Nigeria Information and communication technology

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## Introduction

Information and communication technology (ICT) in medical and dental teaching is focused on E-education, which comprises communication, interactivity, and displaying clinical images. Other uses include electronic records of databases, digital imaging, communication between practitioners and colleagues, exposure to new products and developments and tele-dentistry which allows interactive programs and live consultations, thereby enabling people at distant location to learn without travelling far.<sup>[1]</sup> In addition, electronic learning allows students to work at their own pace<sup>[2]</sup> ensuring that they contribute to their own personal professional development.

Computer assisted learning (CAL) otherwise known as —E-education in dental education first emerged in 1971 with its introduction at the University of Kentucky.<sup>[3]</sup> The use of E—E-education and advances in ICT is rapidly increasing in medical and dental education<sup>[4]</sup> and there is evidence that it has an impact in research, training, and patient care.<sup>[5]</sup> Recent studies carried out in America, Asia, Europe and West Indies suggest that dental students have access to substantial IT resources and demonstrated positive attitudes toward the computer and the Internet.<sup>[6-10]</sup> A meta-analysis carried out by Rosenberg et al.<sup>[11]</sup> reviewed over 30

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studies that investigated the use of ICT in dental education and found out that E-education is either as effective as or more effective than other methods of education while promoting positive feelings in students toward learning. A previous study in Nigeria observed that most dental students would like the internet to be used as a supplement in dental education.<sup>[12]</sup>

Although the effectiveness of the E-education in the training of dental students has been widely reported, little or no attention has been paid to the availability of infrastructure to support ICT in developing countries including Nigeria.

The aim of this study is to investigate the use of information technology amongst dental students, dental nursing students and resident doctors in training.

## Materials and Methods

A structured questionnaire was adapted from previous studies in Europe and Asia<sup>[6-8,13]</sup> and administered to clinical dental students in their fourth and fifth year of study during 2010/2011 academic year, dental nursing students in various levels of training and resident doctors training in dental specialties that include orthodontics, pedodontics, maxillofacial surgery, preventive dentistry (oral medicine, community dentistry and periodontology), oral biology and oral pathology, and restorative dentistry (prosthodontics and operative dentistry). The questionnaire (questions and results are shown in Tables 1 to 7–7 and Figures 1, 2 and 3) consisted of twenty-six multiple questions. The questionnaire was distributed to each participant through their class representative and to resident doctors through one of the authors (A.A.O). A total of 160 participants were identified and given the questionnaire. The questionnaire was retrieved after two weeks of administering them in order to ensure that the respondents had adequate time for the questions and 157 (98%) participants completed the questionnaire.

Participation in this study was voluntary, and all participants remained anonymous. The questionnaire and its administration were approved by the sub-dean for research of the faculty of dentistry. The responses were coded into numbers and entered into an Excel database prior to analysis. Stata statistical software was used to carry out the analysis.

## Results

### Participants

The pie chart shows the distribution of participants according to level of training. Overall there were 58 clinical dental students (CDS), 36 dental nursing students (DNS) and 63 resident doctors (RD) [Figure 1].

Figure 1 shows the distribution of participants, 1 = RD, 2 = CDS, 4 = DNS.

The following sections, tables and graphs summarize the students' responses to the questionnaire and these are classified into computer access, computer skills and training, use of the computer for academic reasons, and Internet access and information.

### Computer access

The analysis shows that 86.6% of all the students have adequate access to the computer [Table 1]. Only 2.5% have access in the University, 26.7% have access at home only, 14.6% of them have access at the internet cafes only, while majority of them (40.1) have access at home and internet café [Figure 2].

Figure 2 shows the access to and availability of the computer for the use of the participants.

### Computer skills and training

Most of the participants (48.7%) have the basic skills required to use the computer and this was through personal efforts in over 52.2% compared to the 1.6% that obtained their skills through the University. About 82 (55.5%) of them describe such training as adequate for their computer activities [Table 2].

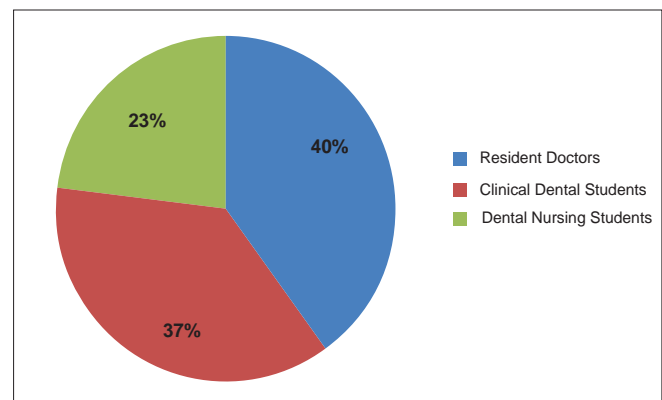


Figure 1: Distribution of participants

Table 1. Questionnaire items on computer access

Questions	%	Number
Do you have access to a computer?		
Yes	86.6	136
No	0	0
If yes, please answer the following questions:		
At university	3.2	5
At home	26.7	45
Other place (Internet cafe)	14.6	23
Home and Internet cafe	40.1	63

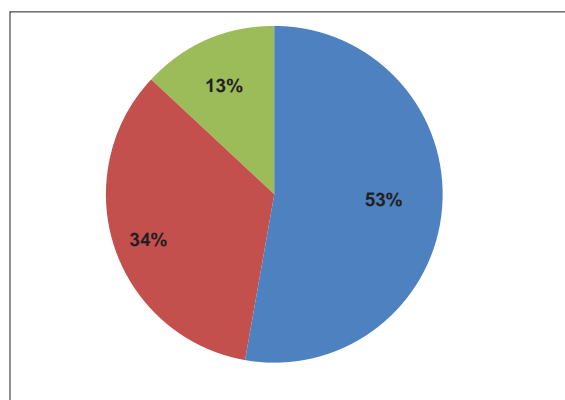
Exposure to computer use Table 3 shows that a significant number of dental nursing students (45.2%) do not use computer skills and training for study compared to the CDS and RD. A significant difference was observed between the residence and CDS ( $P=0.003$ ), between RD and DNS ( $P=0.0001$ ) and between CDS and DNS when they were asked how often they use the computer for study. RD have used computers for more than 36 months for study compared to CDS ( $P=0.03$ ) and similarly for CDS compared to DNS ( $P=0.004$ ). There is a significant difference between CDS and DNS when the use of the internet and word processing was compared between the groups ( $P=0.005$ ). The RD used the computers for multimedia and MedLine search tools compared to CDS ( $P=0.004$ ) and DNS (0.0006) [Table3].

### Quality of IT training at the University

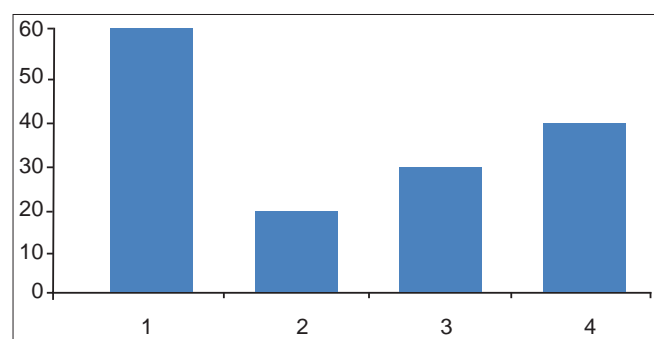
Figure 3. Histogram showing the quality of IT training at the University. The Y-axis shows the percentages and X-axis shows the categories which are 1 for none, 2 for good or very good, 3 for adequate and 4 for poor.

### Computer activities and use

Table 4 shows that over 50% of participants have the basic skills required to use internet and presentation and over 30% use the computer daily for academic and personal



**Figure 2:** Access to and availability of the computer for the use of the participants



**Figure 3:** Bar chart showing the quality of IT training at the University. The Y-axis shows the percentages and x-axis shows the categories which are: 1 for none, 2 for good or very good, 3 for adequate and 4 for poor

activities. However, about 70% do not have access to printers and only 30% have access at the internet café or at home [Table 5].

### Internet access and information

Over 95% of participants have access to internet and amongst those that do, about 50% think the availability is adequate and very easy to use and majority of them get access via the internet cafes or at their homes [Table 6]. Over 30% are very confident about the accuracy of the information and a similar percentage thinks the information is relevant. About 30% of participants use their emails about once or two—three times a week [Table 7].

## Discussion

Facilities for ICT to aid E-education are not in existence at the Faculty of Dental Sciences, University of Lagos which is the first dental school in Africa. There is no computer resource center and only staff have access to the limited

**Table 2. Computer skills and training and computer activities**

Questions	%	Number
How long ago did you first start using a computer regularly?		
Not using regularly	15.12	21
1-6 months ago	15.12	20
7-12 months ago	8.4	13
13-24 months ago	12.6	20
25-36 months ago	8.4	16
37 or more months ago	40.6	65
How would you grade your general IT skills (Windows, Microsoft Office, and Internet)?		
Unable/beginner	15.1	23
Competent in some basic skills	48.7	79
Competent in most basic skills	36.1	55
How did you familiarize yourself with computers?		
Through a course in the university	1.6	3
Through personal study and experience	52.2	92
Through a special course	9.2	11
Through a course in the university, personal study and experience, and a special course	6.7	10
Through a special course and personal study and experience	25.2	34
Through a course in the university and personal experience	1.6	2
How would you describe the quality of IT training you received?		
Good/very good	25.2	33
Adequate	55.5	82
Poor/very poor	19.3	41

**Table 3. Computer skills and training and computer activities used for study, by level**

Questions	Resident doctors	Clinical dental students	Dental nursing students	Pa	Pb	Pc
Length of time students said they had been using computers regularly	% (N)	% (N)	% (N)			
Not using regularly	12.8 (8)	31.9 (20)	45.2 (15)	***	***	NS
1-6 months	17.9 (7)	12.7 (6)	25.8 (8)	NS	NS	***
7-12 months	7.7 (5)	10.6 (7)	9.7 (3)	NS	NS	NS
13-24 months	10.3 (6)	8.5 (4)	6.5 (2)	NS	NS	NS
25-36 months	12.8 (5)	12.7 (6)	9.7 (3)	NS	NS	NS
37 or more months	38.5 (18)	23.4 (3)	3.2 (1)	***	***	***
IT skills						
Unable / beginner	10.3 (5)	14.9 (10)	12.9 (5)	NS	NS	NS
Competent in some basic skills	56.4 (32)	59.6 (33)	71 (25)	NS	***	NS
Competent in most basic skills	33.3 (16)	25.5 (15)	16.1 (5)	NS	NS	NS
Computer activities						
Internet	85.7 (54)	89.6 (52)	45.2 (26)	NS	NS	***
Word processing	52.4 (33)	62.1 (39)	25.8 (12)	NS	NS	***
Multimedia	57.1 (36)	37.9 (22)	9.7 (9)	***	***	NS
Presentation	71.4 (45)	74.1 (43)	6.5 (7)	NS	***	***
Medline	33.3 (21)	10.3 (6)	9.7 (2)	***	***	NS
Data management	4.3 (13)	15.5 (9)	3.2 (3)	NS	NS	NS

NS- Not significant, \*\*\* significant, ccomparison between resident doctors and clinical dental students, ccomparison between resident doctors dental nursing students, ccomparison between clinical dental students and dental nursing students.

**Table 4. Questions on computer activities**

Questions	%	Number
What features of computers do you use more in the pursuit of your studies?		
Internet	50.6	80
Word processing	30.4	48
Multimedia	81.6	129
Presentation	55.7	88
Medline	20.8	33
Data management	12.7	20
other	5.7	9
How would you rate your ability to use a word processor to produce a page of text		
Unable/beginner	21	36
Competent in some basic skills	51	75
Competent in most basic skills	28	44

internet services through the support of the Education trust funds (ETF) disbursed by the Federal ministry of Education, Nigeria. The Faculty of Dental Sciences is the leading Dental institute in Nigeria that offers undergraduate training in Dental surgery and Dental Nursing. It also offers post graduate training in all the major dental specialties such as maxillofacial surgery, restorative dentistry (prosthetics and conservative dentistry), oral medicine, community dentistry, periodontology, pediatric dentistry, orthodontics, oral pathology and biology. Dental students are admitted through the University of Lagos following completion of compulsory six years of high school education. As part of

the training, students spend a year at the main University campus taking advanced level science courses which includes an introduction to the use of the computer. The remaining five years are spent at the college of medicine campus of the University along with other medical students in medicine, pharmacy, physiotherapy, and pharmacology. Dental nursing is a relatively new training program that is run by the Lagos University Teaching Hospital management with the support of the Faculty of Dental Sciences. Resident doctors are post doctoral candidate seeking professional qualifications in dental specialties for six years to become fellows of either the West African College of Surgeons or National Postgraduate Medical college of Nigeria.

In the present study, we observed that 86.6 of all the participants have access to the computer and only 2.5% have such access to computers and % to internet within the University (College of Medicine campus of the University of Lagos). This is similar to the result of a previous study in 2007 that observed that only 7.5% had access to computer in the University.<sup>[12]</sup> In contrast to the present study, students in developing countries such as Jordan were reported to have access to a substantial amount of computers and internet services within the University.<sup>[8]</sup> Majority of the participants in the present have exposure to the use of the computer for over three years and about 50% of them have the basic computer skills and training. These skills and training have been acquired through personal study and experience, suggesting that most of them are self motivated. Less than

**Table 5. Questions on the use of computers and printers**

Questions	%	Number
How often do you utilize the computer for academic activities		
Everyday	33.6	58
2-3 days a week	32.8	54
Once a week	22.7	27
Once a month	9.2	14
Never	1.7	4
How often do you utilize the computer for personal use?		
Everyday	37	65
2-3 days a week	34.5	47
Once a week	21.8	29
Once a month	4.2	9
Never	2.5	4
Do you have access to a printer?		
Yes	31.9	48
No	68.9	109
If yes, please answer the following questions:		
At university	5.8	7
At home	18.5	31
Other place (Internet cafe)	21.8	31
Home and Internet cafe	16.8	30
How would you describe the access and availability of the printer?		
Good/very good	25.2	39
Adequate	40.3	63
Poor/very poor	36.1	54

2% got their training through the University compared to colleagues in Jordan and Europe who are exposed to ICT as part of their dental training.<sup>[7,8]</sup>

A significant difference was observed between RD and either CDS and DNS when the duration of exposure to the use of computer, use of multimedia and Medline search was compared amongst the three groups. This may be due to the difference in their level of training and academic requirements. In addition, RD are on a stipend which allows them to purchase their personal computers; are required to carry out research and write a dissertation as part of their training; and these require frequent use of and access to ICT.

Despite the challenges that students and doctors in training encounter in getting access to adequate or substantial use of ICT, a considerable number of them have the basic knowledge required to operate the computer. Majority of participants (95%) have access to the internet and 50% of them get access in their homes and internet cafes. This is comparable to a study in Chile reported in 2006, where 96.4% of dental students have access to the internet, with over 70% of them having internet connections in their homes.<sup>[14]</sup> Consistent with a previous study in Nigeria

**Table 6. Questionnaire items on internet access**

Questions	%	Number
Do you have access to the Internet?		
Yes	95	149
No	5	8
If yes, please answer the following questions:		
At university	26.18	39
At home	28.19	42
Other place (Internet cafe)	20.13	30
Home and Internet cafe	25.60	38
How would you describe the access and availability of the Internet?		
Good/very good	37.8	60
Adequate	49.6	74
Poor/very poor	12.6	18
How easy do you find the Internet to use?		
Very easy	48.7	80
Fairly easy	26.9	40
Average	21	26
Not very easy	2.5	4
Not at all easy	0.8	2
How quick do you think it is to use		
Very quick	26.1	38
Fairly quick	32.8	56
Average	33.6	52
Not very quick	6.7	9
Not at all quick	0.8	2

**Table 7. Questionnaire items on internet information**

Questions	%	Number
Overall, how confident are you with regard to the accuracy of information on the Internet?		
Very confident	31.9	45
Fairly confident	42.9	76
Average	20.2	29
Not very confident	3.4	5
Not at all confident	0.8	1
Overall, how confident are you in the relevance of information on the Internet?		
Very confident	34.5	49
Fairly confident	35.3	64
Average	23.5	33
Not very confident	6.7	9
Not at all confident	0	0
How often do you use email?		
Everyday	15.1	29
2-3 days a week	31.1	46
Once a week	31.1	45
Once a month	19.3	30
Never	3.4	6

reported in 2007, over 30% access their emails once or more than once a week similar to 26% reported in Britain<sup>[7]</sup>, in contrast to 74.1% reported in 2010 in Iran.<sup>[10]</sup> In a previous study reported in 2007 in Nigeria, nearly 30% of students



rarely accessed their emails<sup>[12]</sup> compared to 3.4% observed in the present study. The difference can be ascribed to the difference in the years of study (2007 and 2010) and the gradual increase in the use of internet services via mobile phones. The use of social network sites as a virtual means of communication by students is another responsible factor. Majority of the students found the use of the internet very easy (48%) and fairly quick to use (38%).

## Conclusions

The findings of the study show that dental students and resident doctors in training have the requisite knowledge to operate the computer for use in their study and personal activities. However, these are limited by the availability of ICT facilities to support their training using the E-education. In order to support learning, research and training of future doctors, nurses and specialist, there is a need to establish computer resource centers at the faculty of dental surgery in Nigerian Universities. With the availability of these resources, future studies should investigate the use of E-education in dental education in Nigeria amongst students and staff in order to establish the best academic framework to improve delivery.

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